

HELP SCREEN

KILLS 99 PERCENT OF ALL KNOWN BUGS

Are you sick of slipped disks, failing memory, wrenched sockets, blurred vision and that strange whining noise you hear every time you switch on your PC? Yes? Then what you need is Professor Poke's *Patent Ophidean Extract*. The Professor guarantees that this non-water based product always effects a cure when applied to even the most intractable problem. So why suffer any longer? Don't delay. Gather round and take advantage of this amazing, oft repeated offer – today.

Right, on with the show. Many of you won't be able to find Professor Poke, and so you may wish to seek the solutions to your problems in *Help Screen*. If you're a newcomer to the world of PCs or you're branching out into new areas, you are likely to need a helping hand through the difficult bits – feel free to ask. All questions welcome; the answers are usually relevant to others.

Help Screen needs your input too. The experts among you may like to use these pages to pass on a little learning, perhaps even to show off a bit. See your name in print and gain some fame in exchange for just a few lines of wisdom. There will be tricks you've learned that make computing easier. Let others know the problems and the solutions – they often cast light on other problems as well.

It doesn't matter whether you think they're important, your experiences could save someone else hours of frustration. Share the thrill of discovery with us – in all its gory detail, please, and be in with a chance at a total of £50 worth of real money I'm trying to give away every month. Send those tips to Steve Patient, *Help Screen*, PC PLUS, 30 Monmouth St, Bath, BA1 2BW.

All the letters we publish are preceded by a symbol to help you identify the level of skill required for each:



Where you see this symbol, you'll find a question or a tip from someone just starting out with the PC. They might be completely new to computing, or simply changing over from some other computing environment. Whichever it is, the whole thing should be comprehensible to any reader.



This is where the wild things are. Questions and answers from the furthest reaches (and innermost depths) of computerland. Inevitably there will be material which demands explanations that we don't have the space for, but at least it offers something to get your teeth into.



Even the facile few can occasionally be baffled. You may have been using your computer for years, but that doesn't mean it can't still throw up a few surprises. This is the heading for tips on batch files, pop-ups and utilities.



PC PLUS WARNING: some of this material can seriously endanger your PC's health. Use this stuff wrongly and there will be tears before bedtime. Handle anything marked with this icon with extreme caution and remember that PC PLUS can't be held responsible for any data loss or other damage – you have been warned!



This logo precedes a letter concerning the PC PLUS SuperDisk. Here's where you'll find advice and tips on using the various programs and utilities found on the PC PLUS SuperDisk.

OLD FAITHFUL



Many people must be in the position of having a new AT with a redundant XT. Is there any

way the two can be linked with a serial cable so the AT gains the other computer's memory? Could it be used as a RAM disk on the XT and then linked as a virtual drive on the AT? Could it be configured as extended or expanded memory on the AT?

M Ballard
London

This is quite an interesting idea. The cheapest way to achieve it is with the \$25 Network (available from EQ Consultants (0334 84248) for £25). You will need a serial cable, but with this in place you'll be able to access all drives on the XT, including a RAM disk.

There is no way to use the memory of the XT more directly from the AT, unless it happens to be removable and of the type required for the AT, which is highly unlikely. If you need more memory on the AT, perhaps the best option is to sell the XT and use the proceeds to buy more AT memory.

UPDATE



How can I buy the latest version of the admirable word processor, XYWrite? I used this a couple of years ago and although it's

an industry favourite in the USA, I can't find out who distributes it over here.

E Dulwich
London

XYWrite IV appears to be the latest version. I can't find an 'official' distributor, but Software Paradise (0222 887521) lists it at £295.

XYWrite enjoys the same kind of reputation in the US as WordPerfect does over here. It's powerful, flexible and idiosyncratic, but well worth mastering if you have complex word processing requirements.

WHAT A CHARACTER



I have just acquired an IBM PC with a mono 5151 monitor and no documentation.

Unfortunately, it appears unable to produce graphics. From PC PLUS, I have gathered that there are many types of display adaptors. Can I just change the adaptor to display graphics or do I need a new monitor as well?

Robert Allen
Enfield

The original IBM XT had an MDA (Monochrome Display Adaptor) display card, and this only produces characters. You can replace it directly with a Hercules card for graphics, and the same monitor will work. The new card will cost about £40.

IDE MARCHES ON



I bought a Maxtor LXT200A IDE drive via a classified advertisement to go in my home-built 386. It came with no instructions to set it up. I came across a user type (47) in the AMI 386 BIOS that totalled the size of the drive, but the DOS 3.3 FDISK will only give me 1024 cylinders – 128 Mbytes, while I want the full 201 Mbytes. Is there any way around this?

Stephen Valente
South Shields

The AMI BIOS should allow you to enter a user-defined drive type. Ambar Systems (0296 435511), who distributes Maxtor drives in the UK, tells me that you want 816 cylinders, 15 heads and 32 sectors per track. Any type that adds up to the same numbers will also work.

That last statement probably sounds a bit odd. However, this IDE drive (and many others) are of a type called 'translating'. It doesn't really have 816 cylinders, 15 heads or 32 sectors. It almost certainly has many more cylinders with a lot less heads and sectors. This has certain consequences.

The first is that while you may be able to low-level format it, your new format is unlikely to make any use of the drive defect table (the list of where the bad tracks are).


```

Sorry, no mail found

* Message Section contains 619 active messages, numbered: 1 - 656.
* Highest Message you've read is number 0.

Press [ENTER] to continue...

MAIN MENU:

[M].....Message Menu      [F].....Files Menu
[C]....Comments to the SYSOP [B].....Bulletin Menu
[P]....Page (Ring For) SYSOP [I]....Initial Welcome Screen
[V].....Verify a User       [Y].....Your Settings
[S].....System Statistics    [U].....Userlog List
[G].....Goodbye & Log-Off    [H].....Help Level
[N].....Company Newsletter   [?].....Command Help
[Q].....>> QUESTIONNAIRE << [D].....Enter A Door

You have been on for 4 minutes, with 35 remaining for this call.

MAIN MENU [M F C B P I V Y S U G H N ? Q D] : f
Esc for Command?, Home for Status || Capture Off || On: 00:04:29
  
```

1 The Pecan Bulletin Board System (BBS) is run on the popular *Wildcat!* software, which is fairly user friendly. After the introductory screens, the main Pecan menu appears

```

[G].....Goodbye & Log-Off    [H].....Help Level
[N].....Company Newsletter   [?].....Command Help
[Q].....>> QUESTIONNAIRE << [D].....Enter A Door

You have been on for 7 minutes, with 23 remaining for this call.

MAIN MENU [M F C B P I V Y S U G H N ? Q D] : f
FILE MENU:

[Q].....Quit to Main Menu    [I]....Information on a file
[L]....List available Files   [D]....Download (BBS -> YOU)
[U]....Upload (YOU -> BBS)    [N]....New Files since [N]
[T].....Text Search          [S]....Stats on Up/Downloads
[F].....File Transfer Info.   [G].....Goodbye & Log-Off
[H].....Help Level           [?].....Command Help
[M].....MESSAGE SECTION      [V].....View a .ZIP file
[R].....Read a TEXT file

You have been on for 7 minutes, with 23 remaining for this call.

FILE MENU [Q I L D U N T S F G H ? M V R] : I
Enter area(s), [?] to list areas, [ENTER] for menu:
Esc for Command?, Home for Status || Capture Off || On: 00:02:08
  
```

2 From the main menu, you go to the [F] (Files) menu where you get a choice of areas. Since this is a programmer's BBS there are thousands of files available

DOWN THE LINE



I'm thinking of buying a modem to join bulletin boards. The only thing that puts me off is the difficulty of getting definitive answers as to just how hard it is to get to grips with communications. No one will give me a straight reply as to how you do things. I will probably want to download

files (documents and programs). How difficult is it really?
George Cunningham
Kidderminster

If someone asked you how to get their pages to print properly you'd have to ask them what word processor they were using,

The second one is that you can't use it with programs that do low-level work – like *SpinRite* or *Optune*. If you lose the low-level format for any reason (though the manufacturers say that this is almost impossible) the best idea is to send it back to the distributor (via your dealer) to be low-level formatted.

A separate problem is that if your BIOS doesn't support user definable types, you will probably need a device driver to get the best out of the drive. Try *Ontrack's Disk Manager V5* from Software Paradise (0222 887521), which will probably solve the problem.

IDE drives are definitely the wave of the future – faster, cheaper and less complex than the original AT drive interface.

THINKING SMALL



You recently carried a small item about a dot-matrix printer that is intended specifically for the printing of labels. Unfortunately, I can't find the reference.

Michael Lever
London

I think you must mean the SLP1000E from Seiko (0628 770988). You can get it from Inmac (081-740 9540), but whoever you buy it from, make sure they carry the special labels you need to make it work. Note that for the same price you can get a standard dot-matrix and use standard tractor feed labels.

EDITING EXTRA



Most people know that a press of the [F3] key brings up the last command typed in at the prompt, but interestingly, you can edit it too. Use the right cursor to bring back characters one at a time, use

SHOWOFF



Most BAT files have echo off as the first line to cut out unnecessary screen output. However, this can be a disadvantage when debugging a batch file or figuring out how one works. To save writing the file unnecessarily, just use the *SHOWOFF.BAT*, which will run the batch file as well if it has no echo off.

```

@ECHO OFF
IF '%1'==' ' GOTO DOC
IF NOT EXIST SHOWBATX.BA* GOTO OK
ECHO TEMPORARY FILES ALREADY EXIST
ECHO DELETE SHOWBATX.BA* AND RE-RUN
GOTO EXIT
:OK
REM PUSHDIR
ECHO SHOWBAT: ABOUT TO EXECUTE BATCH FILE %1 %2 %3 %4
TYPE %1.BAT | FIND /V "ECHO OFF" >SHOWBATX.BA1
TYPE SHOWBATX.BA1|FIND /V "CLS"> SHOWBATX.BAT
@ECHO ON
@CALL SHOWBATX %2 %3 %4
@ECHO OFF
REM POPDIR
REM SET PUSHDIR=
DEL SHOWBATX.BA*
GOTO EXIT
:DOC
ECHO Executes a batch file with ECHO OFF disabled
ECHO so that the stages can seen as they happen.
ECHO The .BAT file to be executed must be in the
ECHO current directory.
:EXIT
  
```



Let me explain; *PUSHDIR* and *POPDIR* are two small Clockwork software utilities. *PUSHDIR* saves the current path and *POPDIR* restores it. Everything works without them but if the current directory is altered, *SHOWBATX.BAT* won't be able to delete its temporary files.

Mark Smalley
Middlewich

I'm sending you a copy of *BATCOM* (Courtesy of Ctrl-Alt-Deli) for this one – it's a useful idea. One extra that might prove useful is to send all the screen output to a file on disk for later viewing. Some large batch files can whizz up the screen so fast and produce so much screen output that it's hard to see what's going on, even with a utility like this.


```

Listing : [A] - MS-DOS Utilities [A..M]

971001.ZIP 4k Program to tell you what the new London telephone codes
3CT.ZIP 7k Show how much space each dir is using.
4DOS30.ZIP 321k Command.Com replacement. Much better ver. Throw away
4DOSINST.ZIP 18k 4dos installation script. N.B. MUST read doc before
4DOSIPS.ZIP 4k Tips on how to set up 4dos v3.0
896K.ZIP 5k put 896k on your xt!
ABCFIN.ZIP 93k a musical abc teaching game v. good
ADDLINE.ZIP 6k Wildcat Util to add the COMMAND prompt to ANSI menus....
AI.ZIP 106k An AI WP, 105K, worth the download.
ALBOOK17.ZIP 27k Print double sided documents to A5 size on Laserjet or
ALIAS417.ZIP 7k Dos command line editor/recall Very good
ANSIEDIT.ZIP 18k create ANSI files
ANSIPAIN.ZIP 33k Anspaint graphics program for creating your own colour
APPBK.ZIP 5k Appointment Book (TSR)
ASC.EXE 13k scans program for ascii strings
ASC.ZIP 3k ASCII Table (TSR)
ASEASY4.ZIP 172k Latest version of 1-2-3 clone AsEasy As .VERY GOOD
ASPM.ZIP 25k Printer Macros (TSR)
ASSIST.ZIP 23k printer util
ATDRVTAB.ZIP 4k Reads and displays the at drive table from your rom bios.
- More - IContinue, IStop, INonStop:
Esc for Command?, Home for Status || Capture Off || On: 00:02:40

```

3 In each file area you can list the files – though it's more efficient to download the file list for off-line perusal. Once selected [D], at the File menu, prompt produces a menu of download protocols

```

Enter the File Name to Download? dazzle.zip

Protocol Selected : Xmodem
Number of blocks : 75
Number of bytes : 9,583
Est. transfer time : 1 minute(s), 42 seconds.

Ready to Send DAZZLE.ZIP. Press Control-X to abort.

```

Receiving C:\MIRROR\dazzle.zip - using CRC

Block #	% Complete	Consec. errors	Total errors
--	--	none	none

PROTOCOL TRANSFER UNDERWAY -- Press Esc to cancel 00:09:24

4 We chose Xmodem and supplied the filename at the prompt. Then we told *Mirror* (the comms program in use) to receive a file using Xmodem – and that's it. Not really very hard

what printer, what paper and so on. Similarly, bulletin boards, on-line services and comms software all work differently to achieve the same ends.

Once you know what you want to do – best learned with one comms package and one BBS (Bulletin Board System) – it becomes easier to operate others, as you know what you want them to do. I'm not a comms guru by any means, but I accessed a

bulletin board I've never used before, the excellent Pecan company support board in Bristol (0272 248076), found out how it works, and downloaded a file in about ten minutes. That time includes taking the screen shots above. Comms is no harder to pick up than other applications; just keep the comms software manuals by your side and make the BBS instructions the first thing you look for once on line.

[Insert] to add characters and then [F3] to complete the rest of the line. For example, the following line is missing the letter 'p':


coy a:.*.

Use the right arrow key to bring up the [c] and the [o], press [Insert] then [p] and then [F3] to complete the line.

Chris Sharp
London

It's good to see those old command line skills are alive and well.

ON RETIRING

 When I retired, I upgraded my system to a 386SX with a view to becoming involved in a club's news letters and posters. I also wished to make use of colour graphics. I now find myself bewildered by multitude of image formats: BMP, PCX, GIF, IMG, TIFF and so on.

Looking through the shareware catalogues for format conversion routines just adds to the proliferation. Can you recommend a book that would shed some light on the subject? Is there any way to print an image directly the way the TYPE command does with text?

G K Allisstone
Southampton

All the file formats you mention are bit map formats (as distinct from scaleable vector formats). One of the nice things about bit maps is that they can usually be translated from one format to another in a way that vector files cannot.

Of the bit map formats, TIFF (Tagged Image File Format) is the most flexible and

FORGETFUL?



When I boot up my computer (an Amstrad PC2286) from the hard disk, I get the following message:

655366 Bytes Total Memory.
655366 Bytes Available Memory.

545312 Largest Executable Program Size.

393216 Bytes Total Extended Memory.
0 Bytes Available Extended Memory.

The computer does not appear to be using the memory over 640K, and when running programs such as *Harpoon* I get a lot of 'Out of Memory' messages. However, when I load DOS from a floppy disk, I get the following message.

655366 Bytes Total Memory.
655366 Bytes Available Memory.

510848 Largest Executable Program Size.

393216 Bytes Total Extended Memory.
393216 Bytes Available Extended Memory.

Can you tell me how I can get the PC to use the extended memory?

Alan S Taylor
Barnsly

The short answer is no, the PC can't use extended memory, although some applications can. I'll expand on that a little – if you look in your CONFIG.SYS file, you'll see that a program called EMM386 is mentioned. This is a device driver for memory above 1 Mbyte, and programs that want to use this memory are encouraged to do so via the device driver. This is stealing all the extended memory.

Most programs assume there is only ever going to be 640K of memory and make the best of it. Others will use high memory if they find it – usually in the form of EMS (Expanded Memory Specification) provided by EMM386 (or something similar). A few programs use extended memory directly – provided they are able to negotiate for it with drivers like EMM386.

The problem is that DOS can never know about this high memory. If DOS could talk, it would tell you that the way some programs can disappear up their own drainpipe and yet continue to do useful work is pure magic.

The advantage for the programs concerned is not just the extra memory they have access to, but the ability to run much faster using 80286 or 80386 instructions in protected mode. The day when all serious AT applications will use MS-DOS as no more than a springboard to a better world is not far away.

MODEL	PARALLEL	MODEL	SERIAL
PB12-36	1 in/2 out 64K £150	SB22	2 in/2 out 256K £225
PB22-25	2 in/2 out 256K £200	SB42	4 in/2 out 256K £335
PB42-36	4 in/2 out 256K £300	SERIAL & PARALLEL MIXED	
PB42-25	4 in/2 out 256K £250	UB64	1SR+1PR/1SR+1PR-64K £150
PB62-25	6 in/2 out 256K £300	2S2P-PP	2SR+2PR/2PR-256K £300
PB82-36	8 in/2 out 256K £400	3S1P-SP	3SR+1PR/1SR+1PR £300

BUFFERS WITH 1 PRINTER PORT & IN-LINE BUFFERS

PB21-25	2 in/1 out 256K £150	SB21	2 in/1 out 256K £175
PB41-25	4 in/1 out 256K £200	SB31	3 in/1 out 256K £200
PB71-25	7 in/1 out 256K £275	SB41	4 in/1 out 256K £250
PB64K	1 in/1 out 64K £80	SB81	8 in/1 out 256K £400
PB128K	1 in/1 out 128K £100	SB64K	1 in/1 out 64K £115
PB256K	1 in/1 out 256K £130	SB256K	1 in/1 out 256K £150

LINE BOOSTERS & DRIVERS

KSM108	Centronics 100ft.	£36
KSM113	Centronics 4000FT	£99
KSM109	Serial RS232 200FT.	£40
KSM110	Serial 3 miles	£99

COMPACT DATA CONVERTERS

KSM101	Serial to Parallel	£40
KSM104	Parallel to Serial	£45
KSM112	Serial ↔ Parallel	£60
KSM111	RS422 ↔ RS232	£60

MAC TURBO PHONE NET KIT

The PHONE-NET connector kit allows different types of MAC machines, APPLE TALK peripherals and file servers to communicate with each other using ordinary telephone cables. (9 pin/8 pin) £15

SURGE PROTECTORS

SP1	Mains plug (RFI)	£13
SP3	3 way adaptor (RFI)	£20
SP4	4 way trailing socket	£22
SP5	In-line power cleaner (RFI)	£13
SP6	In-line power cleaner (EMI)	£17

A WIDE RANGE OF CABLES & CONNECTORS AVAILABLE

MODULAR PRINTER NETWORK

Daisy chain up to 31 PCs to 1 parallel printer instantly. All you need is 1 Transmitter (HPL100) for each PC to be linked and 1 receiver (HPL100) for the printer. Use low cost 4 wire cable and total transmission up to 4000Ft. at a speed of up to 250K bits per second (with power adaptor)
HPL100 - £42 HPL100 - £52
CONNECT UP TO 8 PRINTERS BY USING
HPL200 and HPL200 and daisy chain up to 34 devices. Connect 2 printers to maximum 30 PCs or up to 8 printers to maximum 24 PCs. The printers to be selected by memory resident POP-UP menu.
HPL200 - £52 HLP200 - £62

SERIAL & PARALLEL MIXED

Twin Switch 702: 4 Serial + 3 Parallel Input & 1 Serial + 1 Parallel Output Port. Software Selectable. £220
PPS21 - 1 Parallel + 1 Serial/Parallel Selectable Input Port and 1 Serial/Parallel Selectable Output Port (Bidirectional) £63

NETWORKING

NOVELL ORIGINAL CARDS

8 Bit Ethernet - NE1000	£120
16 Bit Ethernet - NE 2000	£170

NOVELL COMPATIBLE CARDS

8 Bit Ethernet - KZN 100E	£100
16 Bit Ethernet - KZN 101E	£120
16 Bit Ethernet - Card for PS/2 (NE/2 Compatible - KZN201E)	£195
Our Compatible Boards are 4 Layer Boards with Boot ROM Sockets & Work with Workstation & Fileserver.	
8 Port Arcnet Active Hub	£165
4 Port Arcnet Passive Hub	£15
Ethernet External Transceiver	£80

PC-SHARER

With one additional keyboard and monitor two users 100FT. apart can have access to one PC (Supplied with 3X6FT. smart cables) £120
102 Keyboard (XT/AT) £40

POCKET DEVICES

POCKET LAN ADAPTOR: To be plugged into Parallel Printer Port of Laptop, Note Book, Portable, or Desktop PC. Ethernet - BNC Thick Aut. and 10 Base T type and Arcnet BNC & Twisted Pair Type. £270

POCKET MODEM: Hayes Compatible 2400P - V21/22/22 bis £139
2400PM - V21/22/22 bis MNP5/V42 £259

POCKET SEND FAX MODEM
G5-9600 bps Fax Communications Capabilities with 2400 bps - HAYES Compatible Modem 185

POCKET BUFFER (IN-LINE)
64K - £70 256K - £95

FOR NETWORKING CABLES & CONNECTORS - CONTACT:

keyzone

KEYZONE COMPUTER PRODUCTS LTD

454 Sunleigh Road, Alpertown, Wembley, Middx HA0 4NW TEL: 081-900 1525 FAX: 081-903 1486

All prices exclusive of Delivery & VAT

VISA
ACCESS
AMEX

keyzone

RIBBONS

ALL TOP-QUALITY UK BRANDS!

Amstrad			
PCW 8256 Fabric LONGLIFE	2741LL	£4.95	Band C
PCW 8256 Fabric colours	* 2741Col	£4.95	Band C
PCW 8256 Multistrike Films	2741MS	£3.95	Band D
PCW 9512 Fabric LONGLIFE	2746LL	£4.95	Band C
PCW 9512 Fabric colours	* 2746Col	£4.95	Band C
PCW 9512 Multistrike Films	2746MS	£3.95	Band B
DMP 2000/3000/3160	2482FN	£2.95	Band A
DMP 4000	2426FN	£5.95	Band D
LQ 3500	2741LL	£4.95	Band D
Others			
Brother M1009/1109/1209	2412FN	£4.95	Band C
Commodore MPS-803	2412FN	£4.95	Band C
Canon PW1080A	2223FN	£4.95	Band C
Citizen 120D/180E/LSP-10	2488FN	£3.95	Band B
Citizen MSP-20/40/50	2477FN	£4.95	Band C
Citizen HQP-45	2478FN	£6.95	Band E
Citizen Swift 24 pin	2488DN	£4.95	Band C
Epson FX/MX/RX-80/LX-800	2273FN	£3.95	Band B
Epson LX/GX-80/LX-86/90	2454FN	£4.95	Band C
Epson LQ-400/500/800/850	2477FN	£4.95	Band C
Epson EX-800/1000	2774FN	£4.95	Band C
Epson MX/FX-100/1000/1050	2320FN	£4.95	Band C
Juki 6100 Daisywheel	2593MS	£3.95	Band B
Mann/Tally MT80/81	2698FN	£4.95	Band C
Mann/Tally MT85/87	2739FN	£4.95	Band C
Mann/Tally MT86/88	2740FN	£5.95	Band D
NEC Pinwriter/P1/P2/P6	2254FN	£4.95	Band C
NEC Pinwriter/P2+/P2200	2844FN	£4.95	Band C
NEC P6+/P7+	2870FN	£5.95	Band D
Panasonic KXP 1081/1090	2228FN	£4.95	Band C
Panasonic KXP 1180	2905RD	£4.95	Band C
Panasonic KXP 1124	2904RD	£4.95	Band C
Seikosha GP 100	2317FN	£3.95	Band B
Seikosha SL 80/SP 1000/1200	2741FN	£4.95	Band C
Seikosha GP 500/550	2236FN	£4.95	Band C
Shinwa GP-80	2593MS	£3.95	Band B
Star LC-10/NX 1000	2861FN	£3.95	Band B
Star LC-10 4 colour	2869Col	£5.95	Band D
Star LC-24 10	2868FN	£3.95	Band B
Star NL-10	2761FN	£4.95	Band C

★ new! COLOURS ★

CITIZEN 120D/180E/LSP-10	2488Col	£4.95	Band C
EPSON FX/MX-80	2273Col	£4.95	Band C
EPSON LX/GX-80/86/90	2454Col	£4.95	Band C
NEC P6+/P7+	2870Col	£6.95	Band E
SEIKOSHA GP 500A/550A	2236Col	£5.95	Band D
STAR LC-10/NX 1000	2861Col	£4.95	Band C
STAR LC-24 10	2868Col	£5.95	Band D

★ COLOURS AVAILABLE ARE - Blue/Brown/Red/Green
Buying more than one? 2 - OFF 5 - OFF

Price Band A	£5.75	£12.45
Price Band B	£7.45	£16.45
Price Band C	£8.45	£19.45
Price Band D	£10.45	£22.45
Price Band E	£12.50	£27.80

If your ribbon is not listed - please enquire

WE CARRY RIBBONS FOR 800 DIFFERENT PRINTERS
Laser cartridges, ink-jets etc also stocked

Head Office: Unit 2A, Sterte Ind Est, Poole Dorset BH15 2AF

cost effective computing starts here...

CASPELL computer
order line ☎ 0202-666155
fax line: 0202 - 668208
PAPER

BEST QUALITY white, wood free - LOW DUST specification			
11x9.5"	60gsm FANFOLD LISTING	2000	£13.95
11x9.5"	70gsm MICROPERFORATED	2000	£15.95
11x9.5"	85gsm LETTER QUALITY	1000	£10.95
A4 size	70gsm MICROPERFORATED	2000	£19.95
A4 size	85gsm LETTER QUALITY	1000	£11.95
11x9.5"	NCR 2-PART PLAIN	1000	£21.95
11x9.5"	NCR 3-PART PLAIN	700	£24.95
...and of course there's our own UNIQUE A5 continuous paper			
A5 size	80gsm LETTER QUALITY	1000	£11.95

CARRIAGE:- PLEASE ADD £5.00 TO ANY ORDER FOR PAPER

LABELS

Fanfold LABELS from AVERY

Standard address size available 1 or 2 across
3.5" x 1.5" £3.75 per 1000
many other sizes stocked - please enquire

CARRIAGE:- PLEASE ADD £2.50 TO ANY ORDER FOR LABELS

DISKS

branded quality
BENCHMARK - SENTINEL "Need we say more!"
Superior disk for all applications - we use these ourselves
★ High clip level and high magnetic coercivity
★ High performance with reliability

5.25" DS/DD		HD 12MB	
25 for just	£13.95	10 for just	£11.95
50 for just	£24.95	25 for just	£24.95
100 for just	£47.95	50 for just	£47.95
3.5" DS/DD		HD 144MB	
10 for just	£11.95	10 for just	£23.00
25 for just	£24.95	25 for just	£47.95
50 for just	£47.95	50 for just	£89.95

HOW TO ORDER

order by FREEPOST ... or at our SHOP
CASPELL COMPUTER OPEN 9.30 to 5pm MON/SAT
Dept PC+
FREEPOST
Poole
Dorset BH15 2BR
☎ 0202 - 666155
4 lines - 24 hrs
PAYMENT CHEQUES - made payable to CASPELL

DELIVERY	PAPER + ENVELOPES	LABELS	EVERYTHING ELSE
UK MAINLAND	£5.00	£2.50	£ FREE
3/5 DAY SERVICE	£5.00	£2.50	£ FREE
NEXT DAY SERVICE (orders placed by 3:00pm)	£10.00	£10.00	£10.00
PERSONAL CALLERS (Free of Charge (of course))	VISA and ACCESS	OVERSEAS (optional insurance) Surface shipping at cost	POSTAL ORDERS

COPIES OF OUR TERMS OF TRADING ARE AVAILABLE UPON REQUEST. ALL OFFERS ARE VALID FOR 28 DAYS

RE-INK

Still throwing your old ribbons away?

FABRIC
RIBBON
RE-INKING
FORMULA

Now there's

Re-ink

Simple, easy re-inking at home!

One can will Re-ink up to 100 ribbons or top-up 100+!!

- ↓ Completely ozone-friendly
- ↓ Contains NO propellants of any kind
- ↓ Recyclable aluminium can
- ↓ Superb quality dense black ink

All fabric ribbons have press-on tops... Just lift off the top, spray on a teaspoonful or two of ink and leave to dry.
For CLEAN, CLEAR, BLACK PRINT... again and again...

PERSONAL ORGANISER PAPER

NEW! Fanfold paper for your organiser!
Use with LocoScript etc or specialist programs!
6.5-in deep (39 lines) by 3.75-in wide + edge strips
80gsm white paper with microperforated edges.
250-pack £8.95, 500-pack £14.95 inc VAT & post

ALL OUR PRICES INCLUDE VAT
same day despatch + 1st class delivery
ALL ITEMS FREE DELIVERY except Paper and Labels

FROM XT TO AT IN A FEW LESSONS

Steve Patient chronicles the trials and tribulations of a journey into the heart of his PC.

There are an awful lot of old (and not so old) XTs in the world, and I own one of them. Mine was created for the purpose of writing a short series on building an XT late in 1989. There's absolutely nothing wrong with it – it still runs everything it ran then perfectly well.

You know how it is though, the world moves on. I now particularly want to be able to make use of the virtual 8086 mode of the 80386 chip. This is looking increasingly important as a method of improving a PC's ability to utilise current 8086-based applications as well as running programs that take advantage of the large linear address space of the 80386 in native mode. Consequently, I decided the best idea was to fit a new motherboard.

DOWN TO WORK

My XT has a 10MHz 8088-2-based motherboard with 640K fitted, a 720K 3.5-inch disk drive, a 360K disk drive and a 40 Mbyte hard disk. The keyboard is a generic Far Eastern 102-key model switchable XT/AT. It has an Atari trimode amber TTL (Transistor-Transistor Logic) monitor and an ATI WonderEGA video card (which will drive it at a resolution of 800 by 600). The power supply is a 200 Watt model switching power supply. In addition, other bits and pieces come and go since I still use it as a review machine.

The first thing to note is that the whole machine is built from generic parts – no manufacturer-specific parts are fitted. This point is important to anyone contemplating upgrading. If your machine is a manufacturer-specific design – perhaps an

Amstrad PC1512 or a slimline, small footprint model from the likes of Tulip or Viglen – then you are in for some serious problem solving. Fortunately, whatever the label on the front says, most PCs are made from generic, Far Eastern built parts.

Generic PCs come in big cases, measuring about 16 inches by 19 inches. Viewed from above with the front towards you (got that?), the expansion slots sit vertically in the top left hand corner and the power supply goes in the top right hand corner (with the big red switch on the right side).

The drive bays are at the bottom right – usually four, half-height bays and the keyboard connector comes off the board at the centre of the back. There are no other connectors off the main board – all ports are taken from add-in boards. Generic PCs tend to be so standardised that the cases from any source are pre-drilled with holes that match the mounting points in power supplies and motherboards obtained from anywhere else.

MASTERING THE MOTHERBOARD

After some thought I decided to buy the most powerful motherboard I could afford (yes, PC journalists do sometimes have to reach into their pockets). This was a 386DX 25MHz motherboard. I took the line that although this would prevent me from upgrading any other aspect of the system immediately (no more money), it would 'future proof' the machine.

Also, I was interested to see just how much of the original kit would work with the new board. The board I used came from DFI

(081-461 2322 for manufacturers, but retail sales from SDL on 081-300 3399).

In order to get my old motherboard out, I had to remove the add-in cards and the power supply and unscrew the floppy and hard disk drives (and even the cradle that carries them), leaving a bare box. The new board proved slightly larger than the original. Despite this, only one of the original mounting pillars needed to be taken out (the space for it on the new board is occupied by memory slots). The board dropped into place neatly and was quickly screwed down.

Erring on the cautious side, I put the power supply back in and attached the power leads (having noted how they were attached originally). Then I put the EGA (Enhanced Graphics Adaptor) card in and attached the monitor and keyboard.

At that point I turned it all on to see if the motherboard and the EGA card were going to work – they did. The AMI BIOS (Basic Input/Output System) seemed unconcerned by its report of total failure on all disk drives and suggested I press the [F1] key to continue. It then suggested putting a boot disk in the non-existent drive A:. Instead I rebooted and put it into the CMOS setup routines (where an equipment list is maintained). I told it that I had a 720K A: drive and a 360K B: drive and no hard disks.

DEALING WITH THE DISKS

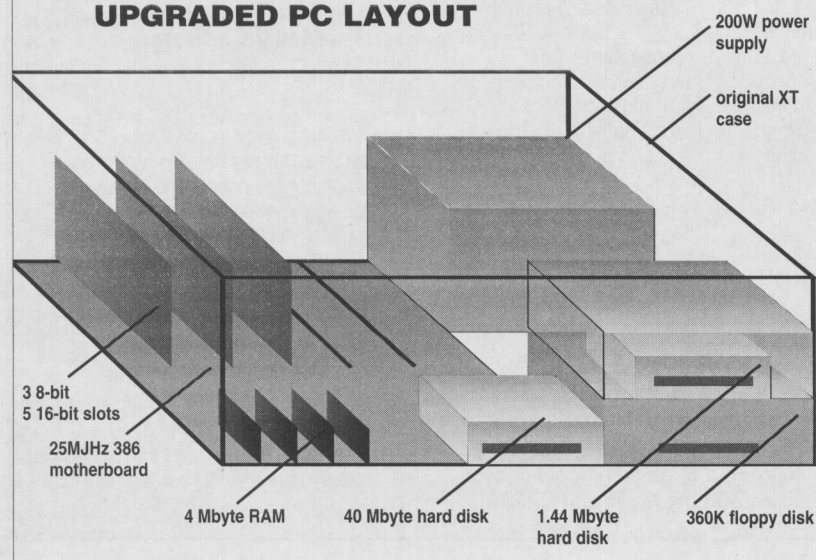
Next, I installed the original floppy disk controller (which included a real time clock, serial port and game port) and attached the disk drives. At this point I had problems. The PC would not boot reliably from the 720K drive and once booted it would not log a different disk unless the other drive was logged first. So it was back into setup where the diagnostics told me that the 720K drive had no disk change line implemented. I reversed the drives.

This worked perfectly and despite having no disk change line the 720K drive, behaved correctly. It was now time for the hard disk. This is a 40 Mbyte Miniscribe RRL drive with a Western Digital 1004/27X controller – fairly common in XTs. Having been asked many times if you could use an XT controller, I saw this as my chance to get a definitive answer. I thought I'd work through the advice I'd obtained in the past.

First, I disabled the BIOS (short R23) – complete failure. Next I set disk C: up in the CMOS to reflect the actual drive – complete failure again. I then took out the R23 link – another complete failure. No hard disk in CMOS – still failed. What was I to do? I read the controller board manual.

This said that jumper 28 should be out

UPGRADED PC LAYOUT



ACCELERATOR CARDS

The simple alternative to changing the motherboard is to add an accelerator card, although I didn't consider this since it would not have met the brief I'd set myself. Accelerator cards will make your XT run faster and therefore speed up the applications you're using, but this does not mean one will make you more productive – it won't make you think faster or even type faster.

There are other serious limitations on them. They are currently all limited to the original bus speed and data size (4.77MHz and eight-bit respectively) on the XT for I/O and they won't give you access to more than the standard 640K of memory (the Sota 386 board is an honourable exception here – it has a fast memory board extension). Besides, at best these are an expensive, partial, solution.

However, if you just need a little more speed and the ability to run *Windows* properly, then consider a 12MHz or 16MHz AT motherboard. They are considerably cheaper, a fifth of the price of a 386 25MHz in fact. One will double or triple the speed of an 8MHz XT and you can usually fit two or 4 Mbytes of RAM (for *Windows*).

Some of these boards are very small, having only one chip (really) besides the 80286, and this makes fitting them in small machines more practical. Moreover, apropos of *Windows*, Microsoft optimised it to run in standard mode on the 80286 based AT – it works well that way.

for an XT. It didn't mention an AT, but I jumped it anyway, and the PC booted up from the hard disk as if it had never been away. Western Digital technical support later told me that an XT hard disk should normally work without any alterations to the card provided the AT thinks it has no hard disk. I checked with a friend's hard card (no jumpers so I had to alter the BIOS address on the original hard disk) and that worked first time.

PROBLEM SOLVING

However, there were still some problems. Firstly, the interleave needed changing from 3:1 to 6:1 to get the best performance (up from an incredibly slothful 30K bits per second (bps) to 113K bps). But this would still be only half the data transfer speed it was. Again Western Digital explained. XT controller cards use DMA (Direct Memory Access), which works badly on ATs. For best performance, you need an AT controller card or an IDE card and drive.

The second option involved more expense and the loss of a perfectly serviceable drive. The first was cheaper, but the drive had to be low-level formatted. This is because XTs number sectors from

nought (usually nought-26 on an RLL drive), while AT controllers number sectors from one (one-27). Since I wanted the drive to perform as well as possible, it was time for a backup and a change of card.

There's a less obvious reason for changing to a 16-bit AT hard disk controller – especially if you're building with older parts sourced without documentation. On the AT bus, the first two contacts in the slot extension are MEM CS16 and I/O CS16. If the card activates these, it is telling the PC it can do 16-bit data transfers.

Unfortunately, it specifies this for a 128K memory block. Few cards use a 128K block, so the signals tend to apply to the next one or two cards as well. If these are 8-bit cards, you get the interesting phenomena of a PC trying to make 16-bit retrievals from eight-bit cards – and failing.

Effectively, half the word is missing. If you look at the BIOS on such a card (using DEBUG) you see that every other byte has suddenly become FFH, impossible but true. For this reason many 16-bit cards are set to always work in eight-bit mode. It's best to make all the cards work as 16-bit, or none of them.

I installed 4 Mbytes of RAM on the

motherboard – the practical minimum for *Windows* in enhanced mode. It will go up to 12 Mbytes, which should be enough for the immediate future (OS/2 2.0 or even UNIX, here I come).

UPDATE

Let me bring you up-to-date. I fitted a Seagate ST21 AT hard and floppy disk controller. After telling the AMI BIOS all about the Miniscribe disk characteristics, I told it to low level format it; this took about two minutes.

I then tried to make an active partition with DR-DOS 5.0 FDISK. This failed, though it took me some time to realise that it was FDISK failing, for I assumed there was a hardware or low-level incompatibility problem. Eventually, searching around for other things to try, I had a go with FDISK from MS-DOS 5.0. This worked perfectly. I still don't know for sure that this was the problem, as I'd reached the stage of trying several things at once, but it worked. I now have the drive back to a 3:1 interleave and running as fast as it ever did.

One extra that is still required is a serial/parallel card. I had these ports on a multi function card (including a floppy disk controller). I can't use this now since the original floppy disk controller on that card can't be disabled and it conflicts with the new one.

Once working the whole machine felt faster, which it should do. The computation speed is more than five times better than the XT. EGA is supposedly pretty slothful compared with VGA (Video Graphics Array) – EGA gives five of every six memory cycles to refresh – but the ATI card performs well enough for now.

More importantly, it can do things the old XT could not. Access to extended and expanded memory, running in protected mode and the ability to upgrade to OS/2 if need be. As cash flow permits, I intend to add an IDE drive (I'll keep the original though) and probably mono VGA (I don't care, I like mono screens).

All in all it's been a worthwhile (if occasionally frustrating) exercise with plenty of scope for future upgrades.

LISTING PAPER



How's this for a bat file?
This produces a reduced size directory listing to wrap around a disk. There's lovely, isn't it?

```
MODE LPT1: 132,8
CHKDSK %1 /V | SORT >PRN
MODE LPT1: 80,6
```

P J Morley
Peterborough

Very nice. It's good to see the old MODE command getting a workout. If we type this in and name it PDIR.BAT, then it's called with a parameter, the disk drive containing the disk for which we want a directory listing, like so:

```
PDIR A:
Next, the MODE command puts the printer into reduced print size and eight lines per inch. Then CHKDSK does its stuff, and the
```

output from CHKDSK is sorted and sent to the printer. Finally, the printer is reset. Note that it must obey Epson/Proprinter command codes for this to work. This is because the hex string sent – OF (condensed printing) 1B 30 (eight lines per inch) – is specific to those printers.

Of course, there's nothing to stop you sending any control codes you like to your printer. For example, your batch files can make use of colour codes on a colour printer, even if your applications don't. Out of interest, I prefer the following command to CHKDSK:

```
DIR %1 | SORT > PRN
I find this more flexible.
```

FACE THE MUSIC



I have been trying to transfer stock details from my Sage Sterling accounting package to a Symphony spreadsheet (bundled with my Amstrad PC2286),

but the beautiful columns import as one long line. Although I'm using ASCII files, I feel that I must have oversimplified the process.

Janet Miller
Byfleet

If you import a text file into *Symphony*, it defaults to a line per cell. To make *Symphony* put each item into a cell, it must be arranged in what's called a comma delimited file. This takes the form:

```
1101,"Injector","Y",1,4,"Southport"
```

Here, each item is separated by a comma, text is wrapped in quotes and each record ends in a hard carriage return. The carriage return tells *Symphony* to start a new line. Import this CDF file as Text/Structured. Most database programs will produce files of this kind, though they may well call them by different names.

LESS LINES



VIEW PRINT in **GW-BASIC** is used to emphasise a portion of the screen or change its background colour. The problem is that you always get the altered background colour on line 25 as well – I've no idea why. The following routine demonstrates the technique, the problem and the solution.

```
5 KEY OFF:CLS
10 VIEW PRINT 6 TO 12
20 COLOR 8,7:CLS
30 PRINT "press q to quit"
40 REM GOSUB 10000
50 FOR Z=1 TO 1 STEP 0
60 A$=INKEY$:IF A$="q" THEN 80
70 NEXT
80 VIEW PRINT:COLOUR 7,8:CLS:END
10000 VIEW PRINT:LOCATE 25,1:COLOUR 7,8
10010 PRINT SPACE$(80);:VIEW PRINT 6 TO 12:COLOUR 8,7:RETURN
```

When first run, this program will show line 25 with the same background colour as the window. Remove the **REM** from line 40 and it will work as you'd expect.

R Raveendran
West Croydon

A simple solution. Oddly enough though, I'd never come across the **VIEW PRINT** statement before. However, I have come across

problems with line 25. Some machines, for example, have a BIOS (Basic Input/Output System) that causes anything printed on line 24 to be repeated on line 25 if used with TTY (TeleType) – interrupt 10H, service 0EH – for screen output.

While I've been unable to prove it, I suspect that line 25 was intended for error messages – as was the case with many other systems when the PC was first developed – and is still treated slightly differently from other lines. Does anyone know for sure?

WISDOM OF SOLOMON



While visiting the Comdex show in Paris, Dr Alan Solomon gets nervous about a fast PC, meets the faces behind the names and notes down some bargains.

When attending the Comdex show recently, I was rather unnerved by a number of 50MHz 486 motherboards that I saw. This is achieved by taking a 33MHz 486 and running it 50 percent faster than it is supposed to go, with some extra cooling. We'll probably see some of these in the UK, and I have to say that I'm extremely worried about this kind of thing.

The problem is that if Intel thought the chips could go that fast, they'd rate them as 50MHz and sell them for rather more than the 33MHz part. Furthermore, the fact that the vendor has tested them for 48 hours at the faster speed doesn't fill me with the confidence that it is supposed to.

THE NAME OF THE GAME

While I was at the show, I met some of the legendary figures of the industry. Somehow, I'd expected them to be eight feet tall, and I was surprised when they turned out to be ordinary people.

Phil Katz, of **PKZIP** fame had a stand, and so did Marshal Magee (*Automenu*). I met Ward Christiansen, the Sysop of the first BBS (Bulletin Board System) and creator of Xmodem, the first file transfer protocol.

I was interested to find that Dennis Hayes, designer of the first intelligent modem, speaks in a slow drawl about the coming ISDN revolution. But one of the highlights of the show for me was meeting and talking to Jerry Pournelle, one of my personal heroes – to my delight I learned that he's an enthusiastic user of one of my products.

There was also someone selling a punch to enable you to put a second hole into 3.5-inch diskettes. The idea is that 720K diskettes have one square hole in a corner and 1.44 Mbyte diskettes have two – so if you just punch that second hole, you've doubled the capacity of the diskette. Many floppy drives sense this second hole to distinguish between the two kinds.

What you're not told is that there is another difference between the diskettes – the coerciveness of the magnetic coating. A diskette converted in this way can indeed be formatted to 1.44 Mbyte, but after a while it will develop bad sectors.

CUT-PRICE POWER COMPUTING

Meanwhile, here in the UK Lew Bishop (0895 255399) is setting new records for 80486 prices. You can get hold of a 25MHz

machine, with 1 Mbyte of memory (expandable to 32 Mbytes), a 1.44 Mbyte floppy, and a 40 Mbyte hard disk for £1,300. Only the monitor is missing, but a mono VGA (Video Graphics Array) is an extra £70. There's no cache included, but Lew tells me that one can be added. Incidentally, he also has the cheapest hard disks; the Kyocera 20 Mbyte costs £100 (entirely suitable for a games computer).

Matmos (0444 482091) is offering the cheapest 386-based PC I've come across; it's a Tatung 16MHz 386DX for £469. There's no hard disk or video, but a mono monitor plus card costs £59, and the company will add a 40 Mbyte hard disk for £125. Another good bargain at Matmos is the £499 Acer 6-pages-per-minute laser printer.

Finally, if you fancy trying a workstation, but don't have enough pennies in your pocket, Eddie Moir at Root (0494 471147) may be able to help you. An IBM 6150 RISC machine is available at £2,000, and even the high-end 6150-135, with 310 Mbyte hard disk and 16 Mbyte of memory is just £6,000. AIX (a sort of UNIX) costs around £2,000 extra.

If you are interested in a Sun 350, that can be bought for £700 (but is diskless). An Apollo Domain-3000, with an 85 Mbyte hard disk will cost you £900, but a word of warning – don't expect to be able to run the *SuperDisk* on it!

therefore the hardest to work with. PCX (produced by *PC Paintbrush*) is one of the more common, but is limited to 256 colours at best, and comes in several flavours. GIF (Compuserve Graphic Interchange Format) is the best for cross platform transfers – PC to Amiga and so on. It is close to being a genuine standard for bit maps.

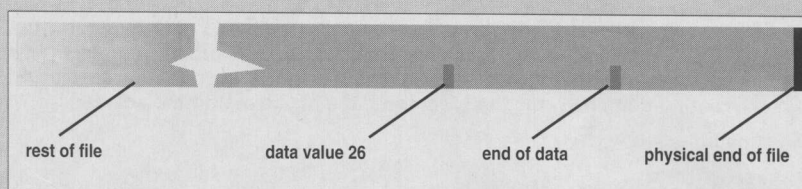
In many ways, the least useful is the Windows BMP format, which nothing else uses and few programs support. Furthermore, there are several kinds of BMP file, Windows 2, Windows 3.0 (16 and 256 colour) and OS/2 format.

The best program I've ever come across for conversion is *TGL Plus* from Software Paradise (0222 887521) which handles all those you mentioned in your letter (except BMP files) – and many others besides. It will scale images, view them, alter aspect ratios, dither colour images for printing, do tracing, image rotation, capture screens and produce slideshows – I really love it.

Graphics Workshop and *Optiks* are two good conversion programs that you can try out for free, since they're both available as shareware. The shareware version of *Optiks* is limited however. Again, they don't handle Windows 3.0 BMP formats – but *Alchemy Graphic Workshop* does – at least the 16 colour kind.

All the programs discussed will print out black and white representations of bit maps. However, remember that a 600 by 400 pixel image is one screen full but prints out as just 2 inches by 1.3 inches on a laser printer. With bit mapped images, you must always remember to take resolution into account.

NO TEXT PLEASE



● When reading from a disk file, DOS can treat several events as the end of file. The value 26 can mark the end, the file byte count as recorded in the directory entry can mark the end or the physical end of the sector can mark the end. The middle option is the most useful



Ever needed to make a text – or almost any file – invisible to the TYPE command and various text editors? The answer is simple. All you need to do is to insert an EOF (End Of File) marker in the file. All the text from that point on will fail to display when a user uses the TYPE command.

M S Habibi
Surbiton

You're absolutely right as far as you go, the EOF (26 decimal) code will stop TYPE. This is a remnant from the days of CP/M programs (with which DOS once had to be compatible). An EOF marker was required in data files because the file length wasn't recorded in the directory. To treat 26 as an EOF you opened a file as a document (an ASCII file), otherwise you opened it as a binary file.

MS-DOS borrowed from the UNIX world in putting file length in the directory entry. This is a better method since it applies to all file types – CP/M programs

often had problems with data files since there was no consistency in the way programmers treated them. Was 26 an EOF? Not if you opened the file as a binary file. If not, where did the data end? It would rarely match a sector boundary.

The UNIX and DOS approach to treating peripherals as files throws up another problem. If you're taking data from a file that's really a serial port, for example, you can't read a directory entry for it first. In the case of virtual files, a value of -1 (FFFFH) is the proper way to show EOF (note that this is a word, not a byte, value). Since few devices will supply this the error condition – no more data – is interpreted as a -1 for conformity's sake. Having said that, many programming languages will let you read 26 as EOF, open files as binary or text and generally make life difficult.

We've wandered a bit far afield here. To get back to your original point. You will find that many PC text editors will not stop at 26, but will merely put an arrow on the screen.

The PC PLUS Fact Panel Guide

These days there's no such thing as a 'standard' PC – instead we've got a range of different disk sizes, graphics adaptors and hardware add-ons, such as mice, modems and memory boards. This makes the claim that a piece of software 'Runs on IBM Compatibles' a bit meaningless, so we're introducing a fact panel on all our reviews which shows exactly what hardware you need to run the program, and what optional equipment the program can make use of. The fact panel has four sections, as follows:

1. Display types.

This section shows the type(s) of screen display supported by the program. Remember that your PC's display type is determined by its combination of display adaptor and monitor, so for example a PC1640 will have a Hercules, CGA or EGA display depending on the MD, CD or ECD monitor in use.

The icons are as follows:

- ☐ 80x25 character text-only – runs on any IBM-compatible PC.
- ☐ Displays Hercules monochrome graphics on Hercules-compatible machines.
- ☐ Displays Colour Graphics Adaptor (CGA) quality graphics on CGA, EGA and VGA machines.
- ☐ Displays Enhanced Graphics Adaptor (EGA) quality text/graphics on EGA and VGA machines.
- ☐ Displays Video Graphics Array (VGA) quality text/graphics on VGA machines only.
- ☐ Displays Multi-Colour Graphics Array (MCGA) graphics on MCGA machines.
- ☐ Displays PC1512 16-colour graphics on the PC1512 only.
- ☐ Displays Tandy Graphics Adaptor graphics on Tandy compatible machines.
- ☐ GEM ☐ Windows

Windows and GEM are both Graphical User Interfaces, which adjust automatically to make the best use of ☐ ☐ ☐ and ☐ displays. Other types may also be supported. You may need to buy Windows or GEM separately.

Programs with just a ☐ work on all IBM-compatible PCs, since all types of display adaptor support a standard text-only mode, which includes the 'IBM graphics character set' –

the boxes, lines and funny faces used by many programs. Monochrome systems may interpret colour text codes (or 'attributes') as flashing, underline etc.

Other icons refer to 'all points addressable' graphics displays, used in business graphics (e.g. Lotus-style spreadsheets), painting and drawing programs, desktop publishers, games and others.

A program may have more than one icon – for example, ☐ ☐ means that the software works with both Hercules and CGA adaptors.

2. Issue Disks

This tells you what type of floppy disk the software is supplied on.

- ☐ 5.25", 360K floppy, or 1.2Mbyte if marked '1.2'.
- ☐ 3.5", 720K floppy, or 1.4 Mbyte if marked '1.4'.
- One icon means only available on that disk type (though check with your dealer)
- ☐ both types supplied as standard
- ☐ or ☐ 5.25 / 3.5 choice – see price for details.

3. Minimum Hardware requirements

Items in this section are mandatory – either the program won't run at all without them, or would be unuseable in practice. The icons are:

- ☐ Single floppy
- ☐ Twin floppy
- ☐ Hard disk
- ☐ 80286 processor chip
- ☐ 80386 processor chip
- ☐ Mouse

- ☐ Joystick
- ☐ Matrix printer
- ☐ Laser printer (Note 1)
- ☐ Telephone line and modem
- ☐ Minimum free RAM, after MS-DOS and any resident programs are loaded.
- ☐ Expanded Memory Specification (EMS) card (see Note 2)
- ☐ Maths co-processor chip (e.g. 8087 for standard PCs, 80287 for ATs and so forth)

4. Other hardware supported

These items are not mandatory, but the program can make use of them. The icons are the same as those used in the minimum hardware section.

Notes: 1. Most laser printers will emulate Epson FX series matrix printers, so will work in basic mode with a matrix-only program. A laser driver indicates support for special fonts and high-resolution graphics. Always double check that your particular model of matrix or laser printer is supported.

2. There are various EMS standards around, the most popular being LIM EMS version 4.0. Check that your type is supported by the program.

OUR VALUE VERDICTS

Product fact boxes also contain verdict ratings, in the range 0 - 5, covering four areas of the product – Range of Features, Overall Speed, Ease of use and Documentation – plus an overall Value verdict..

These ratings are made in the context of the program's price and intended position in the market, so a £25 filer which provides good sorting facilities might get a Range of Features rating of 4, while a £600 bells-and-whistles database which couldn't import text data might be marked down to three.

The overall value verdict is made on the same basis. It is quite possible for a very expensive product to be excellent value for money because it really does do the job well, while a very cheap product might be poor value because it is too lacking in features to do anything at all.